Mobile Devices & Distributed Learning

Dr. Gurminder Singh

Professor, Computer Science

Director, Center for Mobile Devices and Communications

Naval Postgraduate School

Mobile Device Capabilities

- Already exceed the desktop and laptops!
- Networking – 2G, 2.5/3G, WLAN and Bluetooth built in to every single smartphone of today
- Content capture – Pre-equipped with photo (12 Mpixels this year!) and Video (HDTV capture coming!) camera, audio
- Sensors – GPS, Accelerometer already built in, more sensors coming

Opportunities

- Learning on the go
- Learning on demand
- Collaborative Learning
  - Learning from One Another

Learning on the Go

- Preparing for a new mission – military, first responders etc
  - Time is precious
  - Information changes in real-time – out of date material can be dangerous, especially in irregular warfare
- Every soldier can become a collector of data
  - Collect pics / vids using handhelds
  - Auto meta-data tagging with manual options
  - Disseminate to all who need info in real-time

Learning on the Go

- Unit turn over – when a current unit is turning over a territory to a new unit

- Knowledge transfer is critical
- As the situation changes, the information needs to be updated frequently and in real-time
- Nothing suits the needs better than mobile devices


Iraqna Tower
Sheikh Abdullah's House
Omar's Bakery"
Warning: within 20m of suspected IED
Caution: within 10m of a former IED
•4th Day of Ramadan
•Curfew 1100-1500
•1432- VBIED in Rashid
•CG 44ID Visiting Sector
• 1502- 7-66 AR conducting MEDEVAC

On Demand Learning

- We have become used to on demand everything!
- We don't want to wait and like to get things when we want or need them
  - Learning process takes place in context and on demand (as opposed to "organized page turning")
- Enables workers to access training when they need it, reducing classroom training expense, and producing an immediate impact on performance.

Space & Time Dimensions for Learning

- Same space & same time – Synchronous (e.g., classroom, face to face meetings)
- Different space & different time – Asynchronous (e.g. stored and remotely accessible)
- Same time & different space – Synchronous in time (e.g., live broadcast)
- Same space & different time – (e.g. shift work)
- It is possible to develop a single system that caters to all three!

Collaborative Note Taking

- Enable students to
  - Receive power point slides complete with the sound track
  - Annotate slides with their notes
  - Share notes with group members

  in real-time and on their handhelds.

Collaborative Note Taking

Different levels of Collaboration

- Same time and same location
  - In the classroom
- Same time and different location
  - Students who are offsite can receive slides and notes in real-time
- Different time and different location
  - Receive slides and notes after class anywhere
- Same space and different time
  - Subsequent class benefits from the slides and notes

Status

- Students accessed slides and notes just before exam – standard behavior ☺

- Completed in 2005
- Productized by Fuji-Xerox

TwiddleNet Sharing of Content

- Content creation has become easy
  - Phones are a good way to capture pictures, videos and sounds
- Sharing is tedious
  - Push by email or MMS (Multimedia Messaging)
    - Time consuming
    - Wasteful of resources
  - Upload to portals (flickr, youtube etc)
    - Extra steps
    - Privacy issues
    - Inform intended recipients
- For first-responders (or other busy people), this won't work.

What is TwiddleNet?

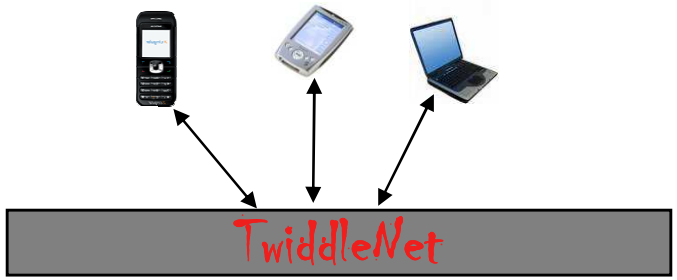
- Turns smartphones into personal mobile servers
- Personal servers host user's content – images, videos, audio, other real-time sensor data
- TwiddleNet gateway ties the personal mobile servers into a network

Why TwiddleNet?

- Immediate content capture and publish
- Full owner control of content
- Harness the power of mobile devices twiddling most of the time
- Allow access to content which is otherwise inaccessible

TwiddleNet Architecture

- Gateway to personal mobile servers
- Allows search, viewing and download of content hosted on personal servers
- Content access statistics for smart caching
- Accessible from handhelds and desktops
- Match the end-user device capability



Smartphones in TwiddleNet

- Phones can work as personal content servers or content requesters.
  - In the server mode, they capture content, tag it and send alerts to the portal.
  - In the content requester mode, they get updates from portal and request desired content from servers.
- Devices can perform both roles simultaneously.

Summary

- Mobile devices have come a long way
  - Exploit the content capture, connectivity and sensing capabilities
- Best match for delivering Advanced Distributed Learning
  - Low cost
  - Convenient
  - Effective

THE MOVES INSTITUTE
NAVAL POSTGRADUATE SCHOOL

Thank you

Dr. Gurminder Singh
Naval Postgraduate School
gsingh@nps.edu

My Mission

Live without a Laptop
and
Be able to do more!!

Samsung Pixon 12

Sony Ericsson Cybershot 12MP

Nvidia Tegra HD Mobile Phone

http://www.youtube.com/watch?v=rQa9nP4yyms